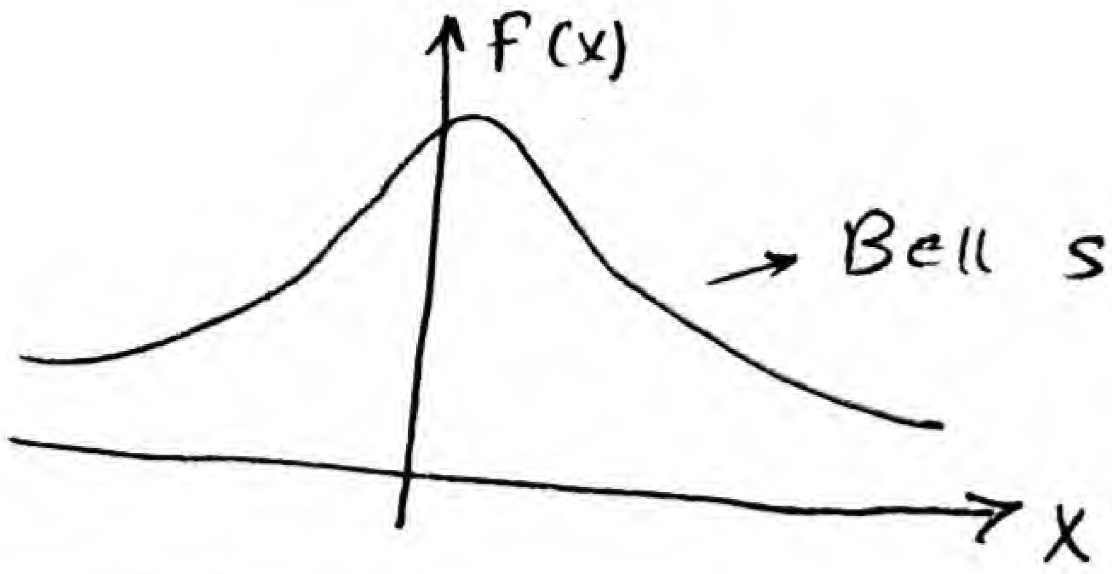
Stocastic Sec $\boxed{7}$

Normal Distribution

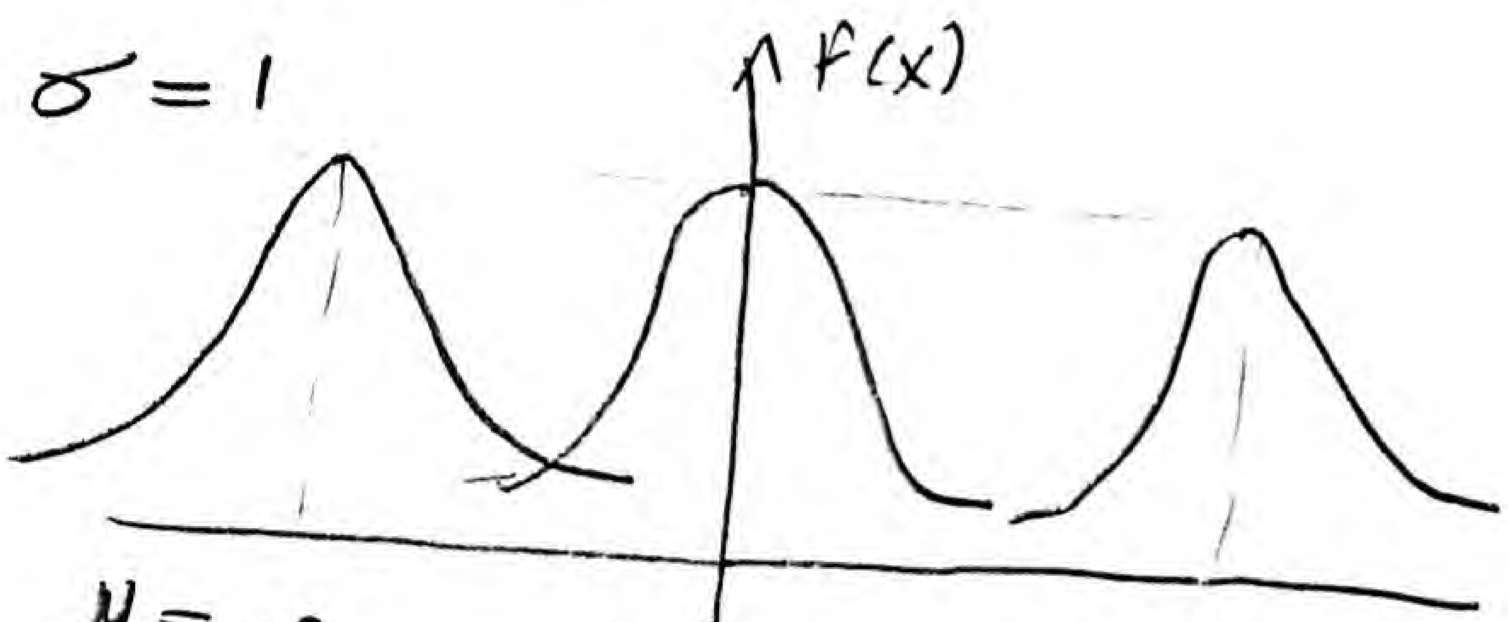
$$F(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$



→ Bell shape

Variation OF μ:

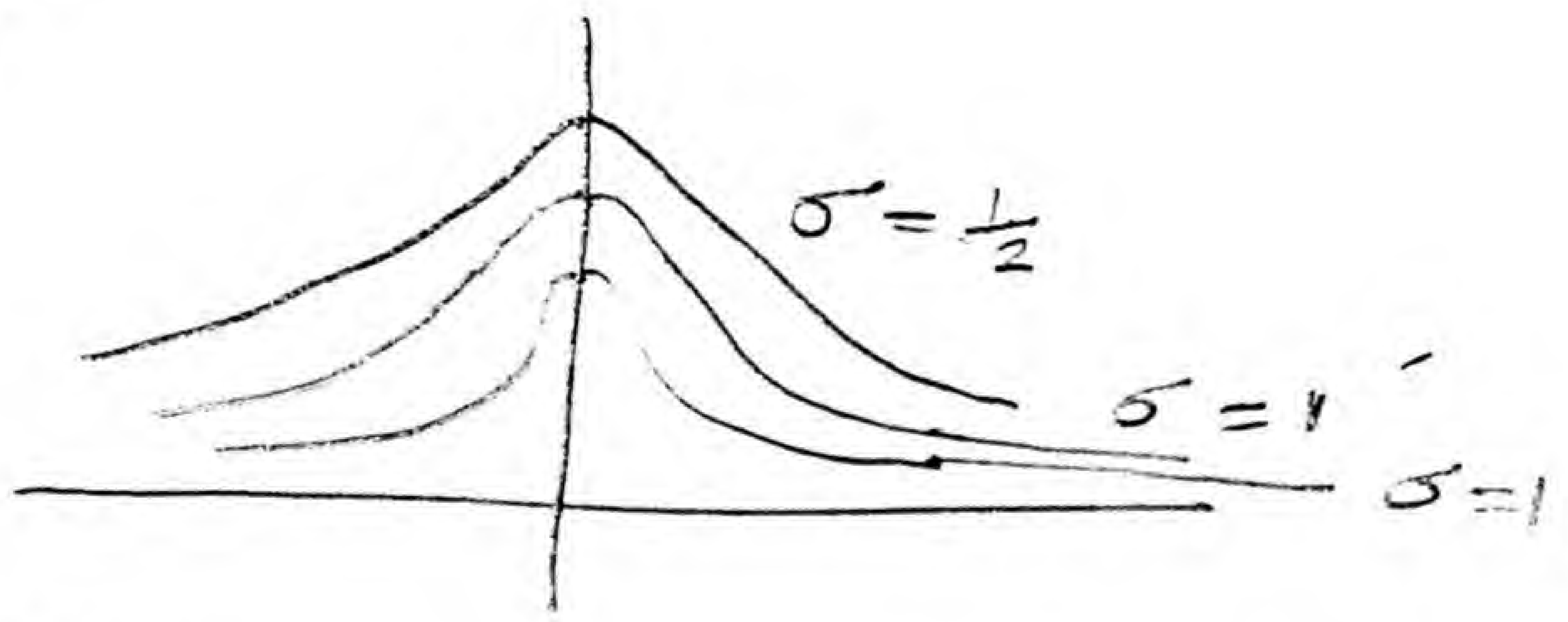
$\sigma = 1$



$\mu = -2$ $\mu = 0$ $\mu = 2$

Variation OF σ:

$\mu = 0$



Notes:

* When $\sigma = 1$, $\mu = 0$
  → Standard Normal Distribution

$$F(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}x^2}$$

Table

$F(x)$, $X = 0.21$

	0	1	.....
0.0			
0.1			
0.2			
⋮			

Sheet 6

$\boxed{3}$ Let X be a random Variable with the Standard Normal Distribution

i) $P(0 \leq X \leq 1.42)$

From table $\boxed{\text{row } 1.4 \quad \text{column } 2}$

$P(0 < X < 1.42) = 0.422$

ii) $P(-0.73 \leq X \leq 0)$

$= P(0 \leq X \leq 0.73)$ $\boxed{\text{row } 0.7 \quad \text{colum } 3}$

$= 0.2673$

iii) $P(0.65 \leq X \leq 1.26)$

$= P(0 \leq X \leq 1.26) - P(0 \leq X \leq 0.65)$

$= 0.1540$

iv) $P(-1.37 \leq X \leq 2.01)$

$= P(0 \leq X \leq 2.01) + P(0 \leq X \leq 1.37)$

$= 0.8925$

v) $P(X \geq 0.13)$

$= 0.5 - P(0 \leq X \leq 0.13)$

$= 0.1292$

$P(|X| \leq 0.5)$

$= P(-0.5 \leq X \leq 0.5)$

$= 2P(0 \leq X \leq 0.5)$

* Values of μ, σ

→ $\mu = 0$, $\sigma = 1$

→ $\mu = \checkmark$, $\sigma = \checkmark$

* Variable

→ Standard Value (t)

→ Actual Value (x)

$$t = \frac{x - \mu}{\sigma} \qquad x = \sigma t + \mu$$

5 Suppose the weight measurements w of 800 girls are normally distributed with mean 66 kg and standard deviation 5 kg

→ Find the number of girls with weights

i) between 65 and 70

→ $P(65 \leq X \leq 70)$

$$t_1 = \frac{65 - 66}{5} = -0.2$$

$$t_2 = \frac{70 - 66}{5} = 0.8$$

→ $P(-0.2 \leq X \leq 0.8)$

$= P(0 \leq X \leq 0.2) + P(0 \leq X \leq 0.8)$

$= 0.3674$

$N = 0.3674 * 800$

$\boxed{N = 294 \text{ girls}}$

ii) greater than or equal to 72

1 The mean and standard deviation on an examination are 74 and 12 respectively

Find the score in standard units of student receiving marks

i) 65 ii) 74 iii) 86 iv) 92

i) $t = \dfrac{x - \mu}{\sigma} = -0.75$

$P(-0.75 \leq X \leq 0) = 0.2734$

2 Find the marks corresponding to standard scores

i) -1 ii) 0.5 iii) 1.25 iv) 1.75

i) $x = \sigma t + \mu$

$= 12(-1) + 74 = 62$